

10.1 INTRODUCTION

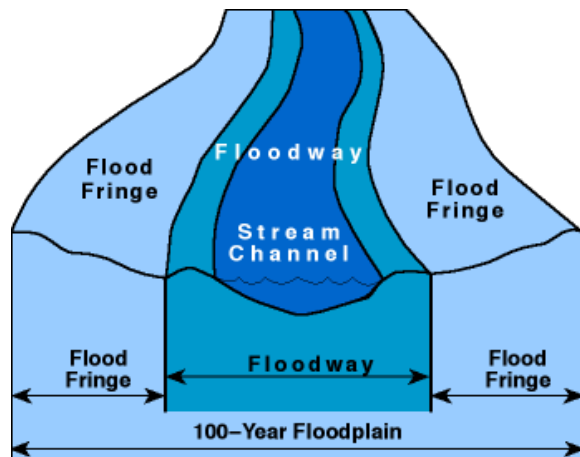
Natural and environmental resources help define the character of Mentor, support the natural systems that provide for wildlife and a healthy environment, provide recreational and educational opportunities, and form the basis of its economy. This begins with the Mentor Marsh, Lake Erie, stream valleys and watersheds, and remaining wooded tracts.

The intent of this element is to promote the conservation and integration of natural systems and resources with a growing residential population, and reduce the impacts of man-made development on the community, property, and lives of the residents.

10.2 FLOODPLAINS

Map 10.1: Floodplain Graphic

According to the Ohio Department of Natural Resources, the floodplain is divided into two areas based on water velocity: the floodway and the flood fringe (Map 10.1). The floodway includes the channel and adjacent floodplain area that is required to pass the 100-year flood events without unduly increasing flood heights. This is the hazardous portion of the floodplain where the fastest flow of water occurs.



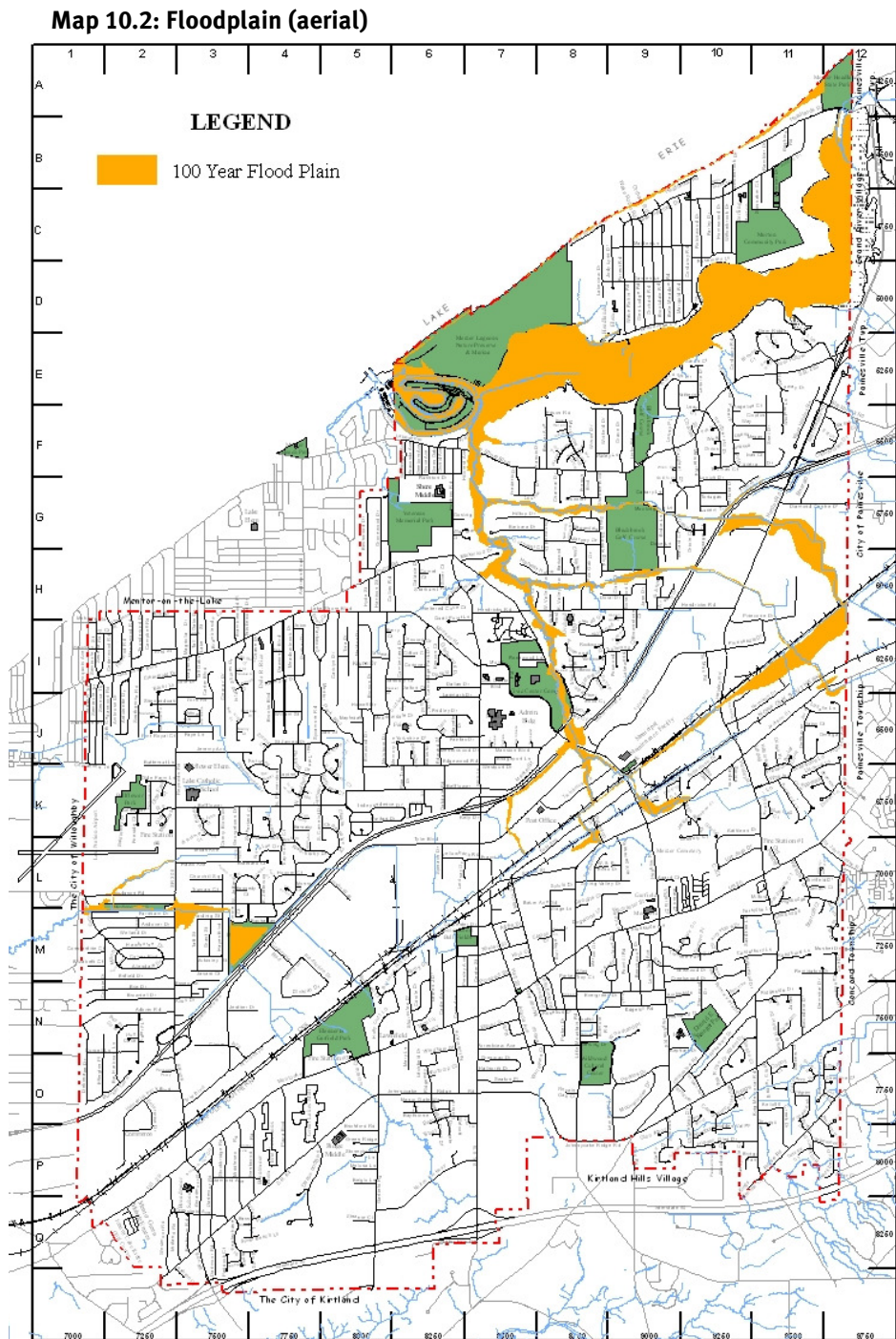
Floodplains are those areas adjacent to water courses that are prone to flooding in certain size storms. Map 10.2 displays the flood plan boundaries for the City of Mentor. The Federal Insurance Administration has established standards for development in these areas. Mentor's administration of the floodplain regulations has proven successful in preventing flood related losses. The Ohio Department of Natural Resources (ODNR) performs periodic Community Assistance Visits (CAV). The most recent CAV was in April, 2007 with all identified administrative and regulatory issues being addressed.

Due to the high degree of hazard found in the floodway, floodplain regulations require that proposed floodway developments do not block the free flow of flood water as this could dangerously increase the water's depth and velocity.

The flood fringe is the portion of the floodplain, outside of the floodway, that contains slow-moving or standing water. Development in the fringe will not normally interfere with the flow of water. Therefore, floodplain regulations for the flood fringe allow development to occur but

require protection from flood waters through the elevation of buildings above the 100-year flood level or flood proofing buildings so that water cannot enter the structure.

The Ohio Department of Natural Resources records show 93 structures within the flood hazard area in Mentor (Maps 10.2). Forty-eight of those structures are commercial or industrial in nature and the other 45 are houses. Out of 19,501 housing units in the city, only 3.0% are located in the floodplain. This fact can be traced to the adaptation of the Flood Hazard Regulations in 1969. The City of Mentor was able to design themselves around the floodplains, so they were able to keep homes away from them. FEMA is currently revising the floodplain maps, so the number of housing units in the floodplain may increase slightly.



Mentor's existing flood damage prevention regulations are in Chapter 1351 of the building code. These regulations identify the 1984 and revised 1995 flood insurance rate maps and associated flood insurance study as the basis for establishing areas of special flood hazard. These regulations establish minimum flood protection standards for buildings and other types of development in identified floodplains. Minimum standards require structures to be flood proofed or elevated above base flood elevations, anchoring of structures, and prohibit fill in floodways unless a property owner can verify that the base flood elevations will not be increased.

18 Inch Freeboard

A “freeboard” is a safety factor expressed in feet above a flood level. Designating an eighteen inch freeboard helps compensate for unknown factors that can contribute to flood heights greater than the height calculated for the base flood and conditions such as wave action, obstructed bridge openings, debris and ice jams, and the effects of urbanization in a watershed. Another advantage of a designated freeboard is the reduction in the cost of flood insurance. The insurance rates for new structures in special flood hazard areas are directly related to their lowest floor elevation compared to the base flood elevation. Disadvantages of freeboard include potentially increased construction costs for structures, and more fill being placed in the special flood hazard areas if the method for elevating the structure is a fill pad.

Cumulative Substantial Damage and Substantial Improvement

The standard requires communities to track cumulative substantial damage and improvements in special flood hazard areas. This will ensure that flood protection measures are incorporated into building reconstruction or repairs after a flood event or any event damaging a structure that was built before the effective date of the first flood insurance rate map (FIRM).

In addition, adding a cumulative substantial damage and improvement provision to the City's code will increase the availability of the *Increased Cost of Compliance* (ICC) flood insurance coverage for building owners. The ICC coverage will pay up to twenty thousand dollars beyond the flood insurance claim payment for compliance with local flood damage reduction regulations. If Pre-FIRM structures have been declared substantially damaged and are required to meet flood damage reduction regulations because of cumulative losses, the structure owner can only obtain ICC coverage if the community has adopted the cumulative provisions language. The additional standards do require that detailed records are kept up to the date of damages and improvements.

Fill Restrictions

Fill in floodplains can cause adverse impacts on adjacent property owners, water quality impacts due to increased turbidity and siltation, and loss of flood storage capacity. Minimum NFIP regulations include guidelines on the type of fill used in construction in a special flood hazard area. Including higher standards regarding fill material would provide quality, stability and compaction standards for fill placed in flood hazard areas.

Foundation Design

The objective of the higher standard is to ensure proper design and construction of building foundations to protect building structural integrity against the effects of flood forces. In many cases foundation damage renders a structure uninhabitable or subject to extensive repairs. The minimum NFIP standard includes foundation design requirements for non-residential structures. The high standards extend these standards to residential structures.

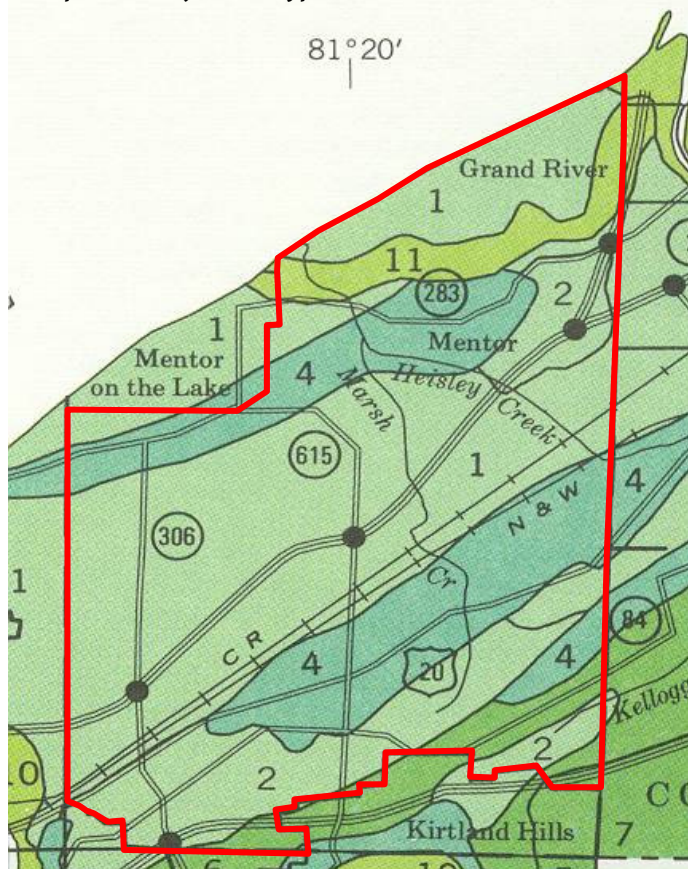
(Resources: Ohio Department of Natural Resources. *Recommended Ohio Floodplain Regulation Criteria for Floodplain Management*. August 2006.)

10.3 SOILS

Mentor is in the Lake Plain physiographic region of Ohio. The greatest geological influence on the area is the former post-glacial Lake Erie. This area was highly glaciated during the last ice age and is characterized by four basic soil types (Map 10.3):

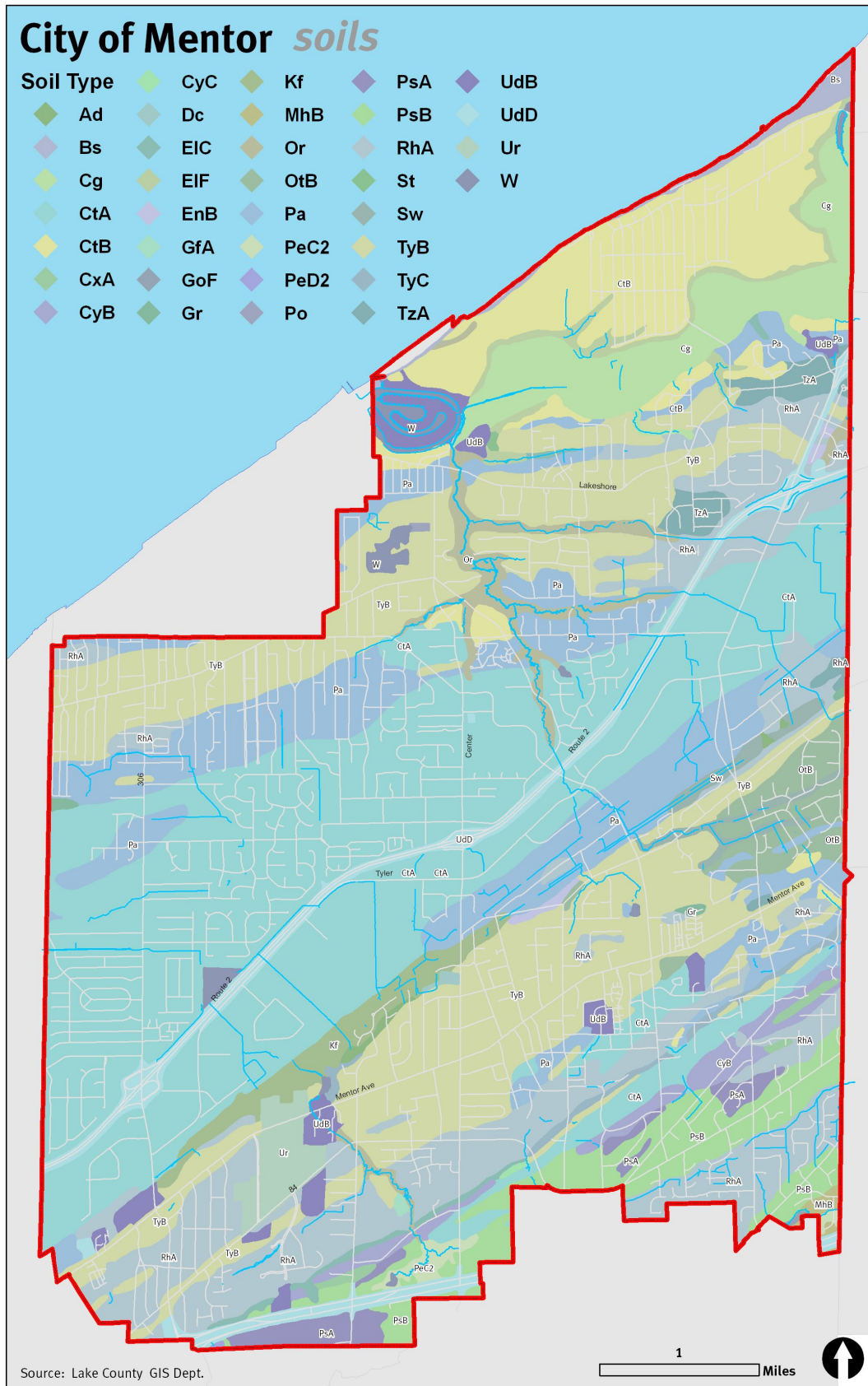
1. Conneaut-Painesville: nearly level and gently sloping, poorly drained soils that formed in silty glacial till or loamy material over silty glacial till, on the lake plain. (Shown as 1 on map.)
2. Red Hook: Nearly level, somewhat poorly drained soils that formed in loamy outwash deposits underlain by stratified material; on lake plain and offshore bars. (Shown as 2 on map.)
3. Tyner-Otisville: Nearly level to sloping, well drained and excessively well drained soils that formed in water-sorted sediment; most on beach ridges (Shown as 4 on map...Mentor Ave., Johnnycake and Lakeshore Blvd.)
4. Carlisle: Level, poorly drained soils that formed in accumulated organic material; in marshes. (Shown as 11 on map. This is the Mentor Marsh area which was the post glacial drainage channel of the Grand River.)

Map 10.3: Major Soil Types



The thirty-five specific soil classifications existing in Mentor are shown on Map 10.4.

Map 10.4: Soils



Soils affected by Humans

There are four soil types that are characterized by human impact. The first one is Urban land, which consists of areas of 10 or more acres that are covered by buildings pavements or other human made surfaces. In this case, the Urban Land is located at the Great Lakes Mall. The next soil type is Udorthents, which is a soil created by cut and filling done for road construction. The last two soil types are smaller concentrations. There is a soil type named Dumps, Covered. This soil type consists of nonorganic waste of broken bricks and concrete etc., from construction projects. The final soil type is Pits, Gravel. These are areas that were surface mined in which aggregate has been removed and the site has been abandoned.

Soils on the lake plain and offshore bars

These somewhat poorly drained soils are on the broad flats of the lake plain and on offshore bars. These nearly level and gently sloping soils are formed in the silty and loamy lakebed sediment and outwash material. The most common soil type on the lake plain is the Conneaut Silt Loam and that is followed by the Painesville Fine Sand Loam. Both are considered to be poorly drained soils with slopes no greater than 4%. The soils are not considered very good for agriculture or development unless they are adequately drained.

Soils on the Glacier Till Plain

These soils are poorly drained to moderately drained soils that are on broad flats and in dissected areas on till plains. In Mentor, these soils are located on the border between Mentor and Kirtland and Kirtland Hills. The most common soil of this group found in Mentor is Platea Silt Loam, which is a nearly level to gently sloping soil that has poor drainage qualities to it. It can be used for agriculture purposes if it is drained or for pasture or hay if it is not drained. When poorly drained, it can be used for development.

There are also small concentrations of Pierpont Silt Loam, 6% to 18% slope with well drained soil, and Mahoning Silt Loam with shale substratum, a poor draining with near level to gently sloping soil.

Soils on Flood Plains, Drainage Ways, Terraces, Marshes, and Hillsides

Carlisle Muck is the most common soil type in this group. Carlisle Muck is level, very poorly drained soil usually located in a marsh. In this case, it is located in the Mentor Marsh. There are also concentrations of Orville Silt Loam, nearly level, somewhat poorly drained soil, that is located along a flood plain in Newell and Marsh Creeks. There are also concentrations of Ellsworth Silt Loam, a sloping to moderately steep slope soil that is moderately well drained, and Glenford Silt Loam, a moderately well drained, nearly level soil.

Soils on beach ridges, terraces, and offshore bars

Some of these nearly level and gently sloping soils are considered to be moderately well drained and some are considered to be poorly drained soils. These soils have been formed by materials being deposited by wind or water along beach ridges or on offshore bars.

Tyner Loamy Sand is the most common soil type on the beach ridges. This soil is a well drained soil that has slopes that can range from 1% to 12% This soil can be doughy

during a dry period, so its suitability for farming can be limited without irrigation. The soil is suitable for development where the slope is not too great.

There are also concentrations of Conotton Gravelly Loam, an excessively drained, 6 to 15% slope soil, Kingsville Fine Sand, a nearly level, poorly drained soil, and Otisville Gravelly Loamy Soil, a nearly level, excessively drained soil.

10.4 WETLANDS AND THE MENTOR MARSH

Wetlands

Wetlands are identified as habitats which are frequently inundated or saturated for a long duration and support characteristic plant life. Areas considered wetlands must meet the three criteria of: hydric soil, a dominance of hydrophytic vegetation, and wetland hydrology. Wetlands are important components for water quality and quantity.

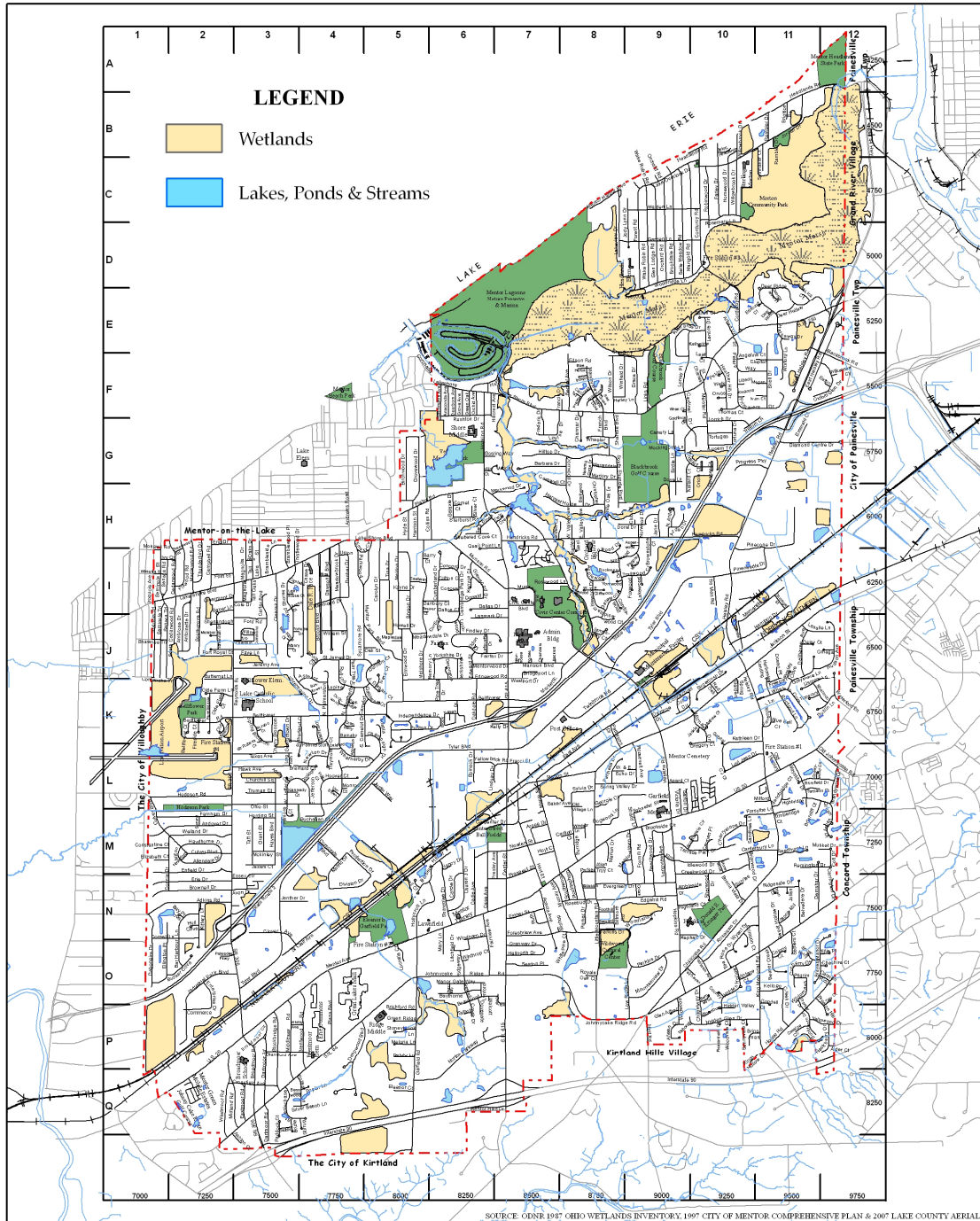
According to the US EPA, wetlands provide water quality protection, fish and wildlife habitat, natural floodwater storage and reduction in the erosive potential of surface water. In Ohio, 90% of the original wetlands have been destroyed since the 1800s. Locally, development pressures have disturbed a large amount of natural wetlands.

The location and approximate boundaries of probable jurisdictional wetlands within the City of Mentor are identified on Map 10.5. These locations and boundaries were derived using the routine method (Level 1) for determining boundaries outlined in the *Corps of Engineers Wetland Delineation Manual (1987 Manual)* (Environmental Laboratory, 1987). This method employs the use of secondary source data including aerial photographs, soils, maps, National Wetland Inventory mapping, and U.S. Geological Survey topographical maps. Limited field verification was conducted in areas where discrepancies were noted between existing secondary source information, and also to determine habitat quality in highly disturbed areas.

Mitigation is required for developers who disturb wetlands on site, but the creation of new wetlands often occurs outside of the watershed that has been impacted. While regulated by the Ohio Department of Natural Resources, impact to these areas should be limited during development activities. This plan encourages mitigation measures to occur in the watershed in which the impact was located.

Map 10.5: Wetlands

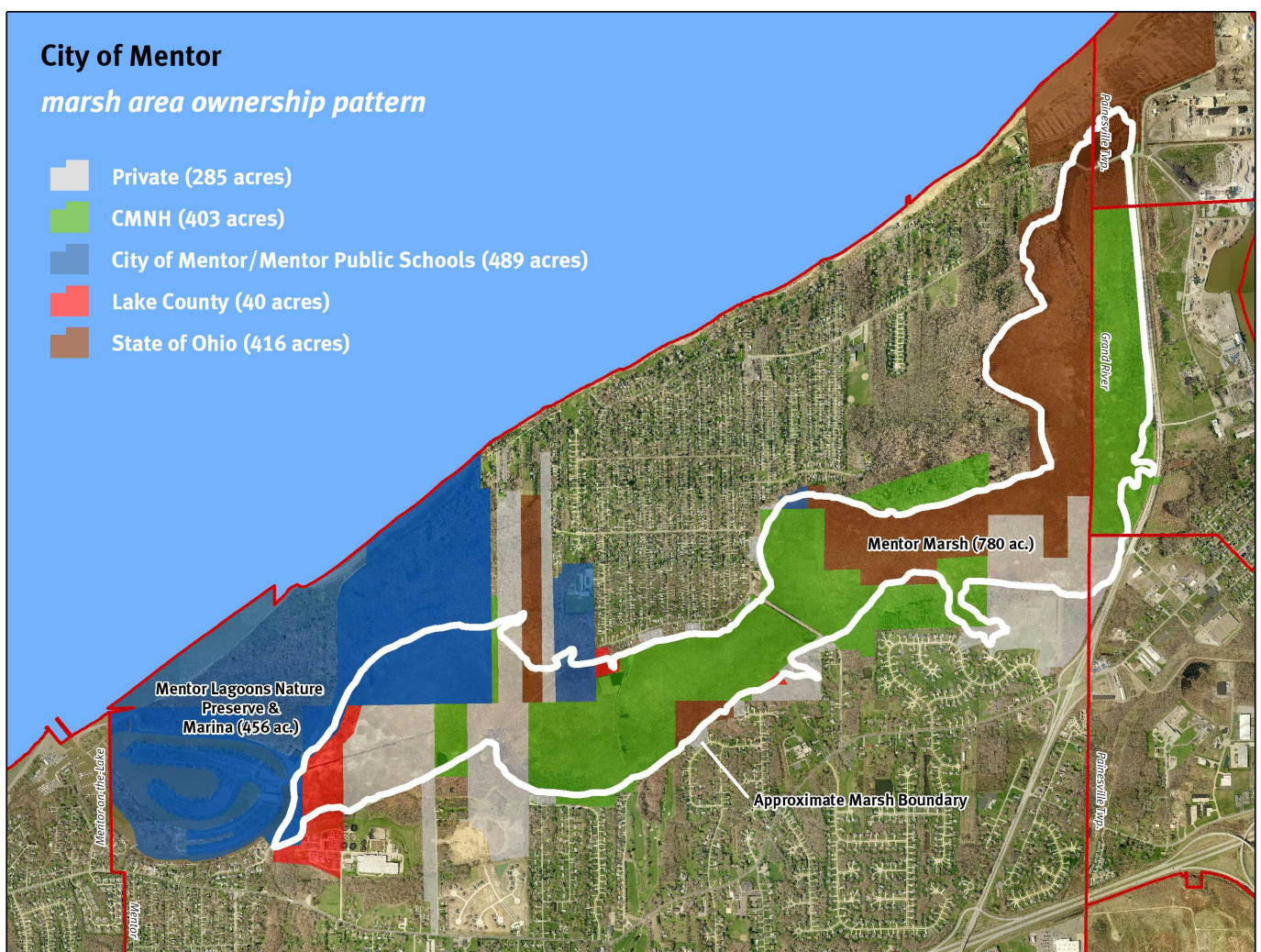
WETLANDS AND OTHER WATERS COMPREHENSIVE PLAN



Mentor Marsh

Mentor Marsh is the largest marsh on the Ohio shore east of Cleveland. Originally, the Mentor Marsh was where the Grand River entered in Lake Erie before the new channel, its current location, was cut. The actual marsh (white outline on Map 10.7) is approximately 800 acres which is characterized by wetlands, woods and fields. Approximately three-fourths of this land area is under the ownership of public or nonprofit organizations. In the 1967 Comprehensive Plan, there were only 400 acres of land under public ownership. The Mentor Marsh State Nature Preserve is a joint effort of the State of Ohio, Department of Natural Resources, and the Cleveland Natural History Museum. These two entities are the primary land owners. The remaining 285 acres (Significant portions lie outside of marsh itself) of marshlands is under private ownership often in large tracts of land that include both wetlands and fields (Map 10.6).

Map 10.6: Floodplain Graphic



The Mentor Marsh State Nature Preserve was established to protect and maintain the marsh area in a natural state. The Marsh Board's objective is to limit or eliminate all man-made intrusions and to allow the marsh to function as a natural ecosystem. To accomplish this

objective, they are attempting to acquire as much of the marsh wetlands as possible. They also wish to obtain a buffer area adjacent to the marsh to minimize or eliminate external influences.

Remaining hydrologic features in the city, such as the marsh, should be protected from future development. Riparian setbacks are a tool local governments can use to maintain riparian area functions. Riparian areas are naturally vegetated lands along rivers and streams. When appropriately sized, these areas can limit stream bank erosion, reduce flood size flows, filter and settle out pollutants, and protect aquatic and terrestrial habitat.

Mentor can establish riparian setbacks through a combination of landowner education, land acquisition, and land use controls on new development. The Lake County Soil and Water Conservation District, land trusts, and other organizations are skilled in assisting communities and landowners with education and acquisition efforts.

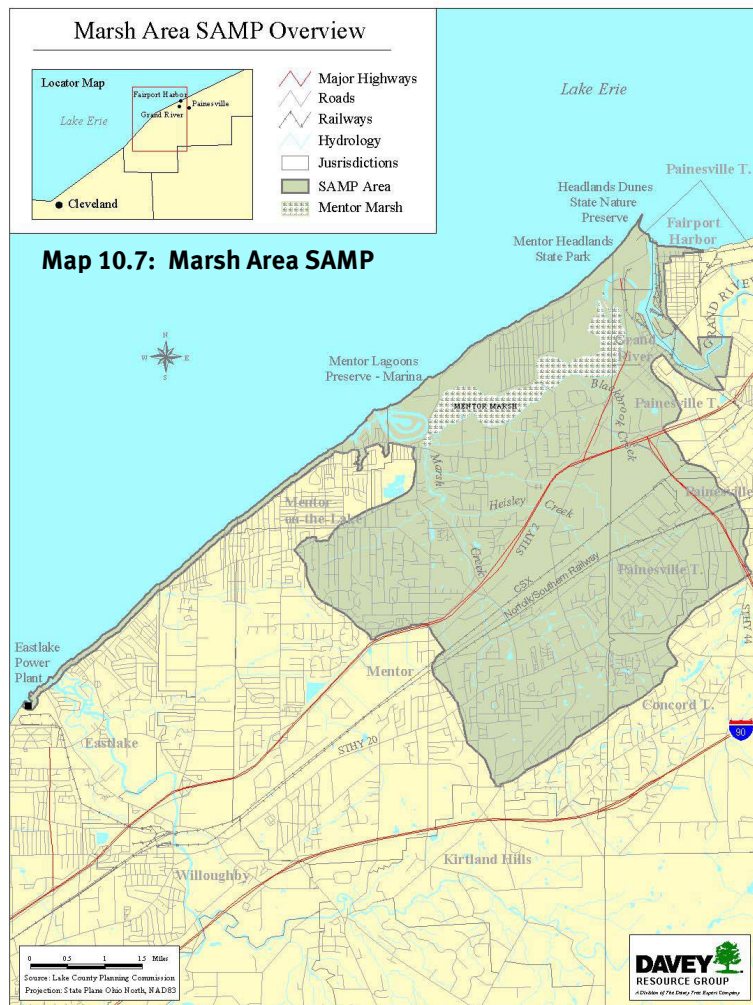
This plan recommends riparian setbacks based on the Chagrin River Watershed Partners model setback ordinance. Riparian setbacks should:

- Range from 25 feet to 300 feet depending on the watercourse drainage area.
- Minimum distances apply to both sides of designated watercourses.
- Conform to community land development patterns & natural resource management goals.
- Include provisions for communities to examine the combined impact of all setbacks (side yard, rear yard, riparian, etc.) in a subdivision or a parcel, make reasonable adjustments to ensure existing lots remain buildable, and to maintain lot yields from new subdivisions to the extent possible.

Mentor Marsh Special Area Management Plan

The Ohio Department of Natural Resources through their Office of Coastal Management undertook the process of developing a Special Management Plan for the Mentor Marsh with the help of Davey Resources Group, 18 non-governmental organizations, 16 local/regional agencies, nine State of Ohio agencies and five federal agencies. Funding was provided by the National Oceanic and Atmospheric Administration (Map 10.7).

A Special Area Management Plan (SAMP) is a “comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone” (Federal Coastal Zone Management Act of 1972, 16 U.S.C.A. Section 1453 (17)).



The Marsh Area Regional Coalition (MARC) was established to develop and promote the Mentor Marsh Area SAMP. The overlying objective of the SAMP is to protect and enhance the environmental, social, and economic assets of the Mentor Marsh Watershed and related communities for the benefit of present and future generations.

The Lake Erie Protection and Restoration Plan (Ohio Lake Erie Commission, 2000) established ten guiding principles for a sustainable Lake Erie watershed. These principles provide a framework for the MARC as it developed the Mentor Marsh Area SAMP. The Plan states that activities in the Ohio Lake Erie watershed should:

- Maximize reinvestment in existing core urban areas, transportation, and infrastructure networks to enhance the economic viability of existing communities.

- Minimize the conversion of green space and the loss of critical habitat areas, farmland, forest, and open spaces.
- Limit any net increase in the loading of pollutants or transfer of pollution loading from one medium to another.
- To the extent feasible, protect and restore the natural hydrology of the watershed and flow characteristics of its streams, tributaries, and wetlands.
- Restore the physical habitat and chemical water quality of the watershed to protect and restore diverse and thriving plant and animal communities, and preserve our rare and endangered species.
- Encourage the inclusion of all economic and environmental factors into cost/benefit accounting in land use and development decisions.
- Avoid development decisions that shift economic benefits or environmental burdens from one location to another.
- Establish and maintain a safe, efficient, and accessible transportation system that integrates highway, rail, air, transit, water, and pedestrian networks to foster economic growth and personal travel.
- Encourage that all new development and redevelopment initiatives address the need to protect and preserve access to historic, cultural, and scenic resources.
- Promote public access to and enjoyment of our natural resources for all Ohioans.

Specific taskforces exist to address/implement various variables with the plan. The following list indicates the taskforce and its associated area of concern.

- **Water Quality**
 - Salt Contamination
- **Land Use and Economic Development**
 - Uncoordinated Land Use Planning
- **Wetlands and Biodiversity**
 - Loss
 - Hydromodification
 - Natural Disturbances
 - Public Understanding
- **Recreation and Public Access**
 - Lack of a Strategic Recreation Plan
- **Shoreline Management and Nearshore Issues**
 - Insufficient Sand Supply Activities
 - Landward of the Bluff Edge

In 2008, the MARC continued its planning initiative with a focus on completing an approved watershed action plan by the Ohio EPA.

This plan recommends continued participation with the SAMP and its dedication toward preservation of the area.

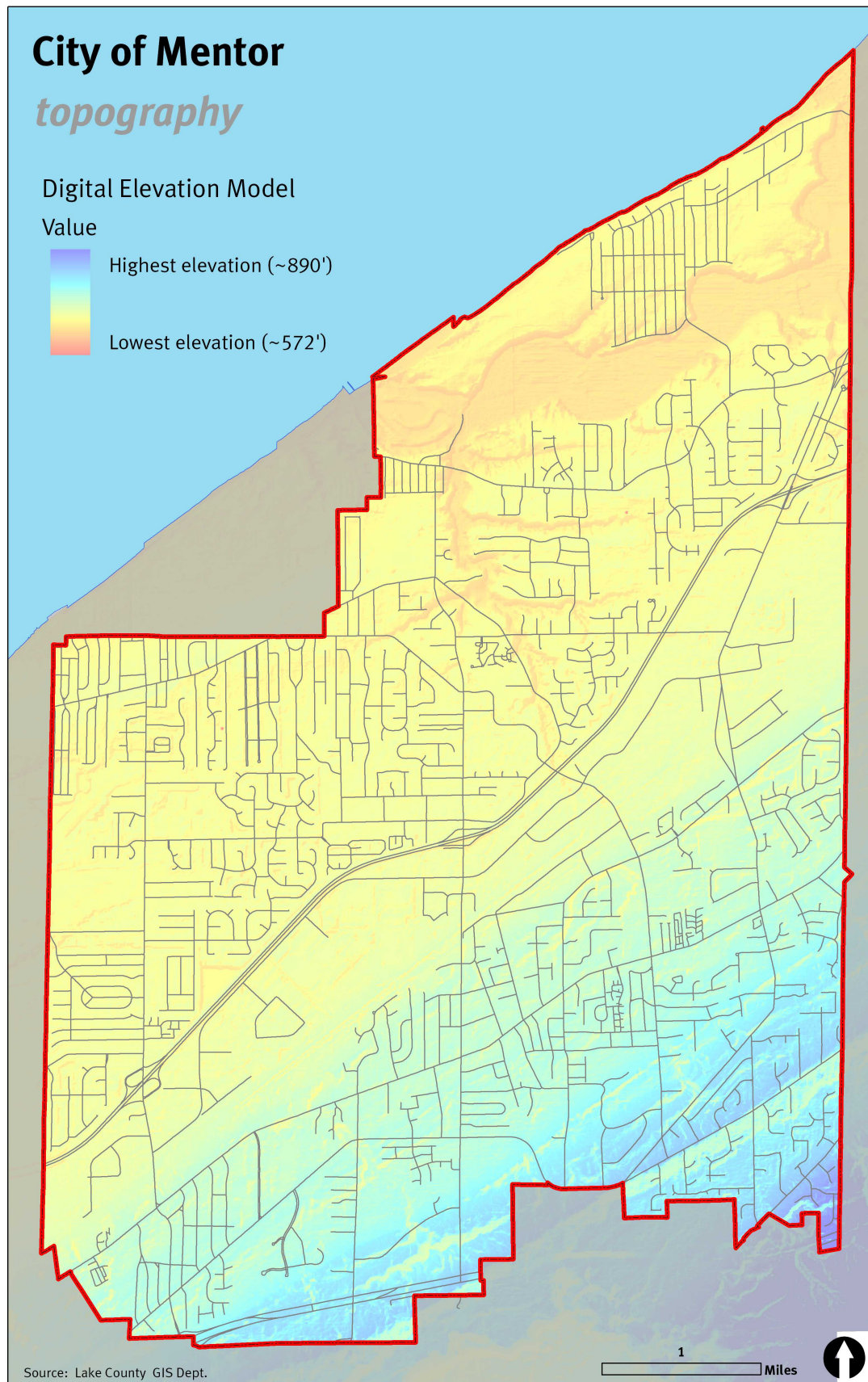
10.5 TOPOGRAPHY

The topography of Mentor and Lake County resulted from glacial movements and the changing lake levels of the prehistoric predecessors of Lake Erie. The city is generally very flat, with moderately steep topography found in the southeast corner of the City; along the ridge north of Mentor Avenue and Jackson Street; and along the Marsh Creek and Mentor Marsh valleys (Map 10.8). Overall, the land falls from a high elevation of 890 feet above sea level (southeast corner of the City) to the 572 feet lake level elevation. This 318-foot difference extends over a distance of approximately 6.2 miles, for an average slope of less than 1.0%. Between the railroad tracks and the lake, the fall is only 78 feet across 3 miles, for an even flatter slope of less than 0.5%.

Significant man-made alterations have been made to the natural topography including the elevated rights-of-way of State Route 2, I-90, and the railroads.

The significance of Mentor's very flat topography is that it impacts the City visually by restricting vistas or long distance views. It is therefore difficult to develop a spatial image of the community since landmarks are not generally visible on the skyline. The flat topography also slows the flow of surface water and results in easy obstruction of major drainage ways.

Map 10.8: Topography



10.6 LAKE ERIE

Lake Erie, the great body of fresh water forming Ohio's north coast, is the fourth largest of the five Great Lakes and the 12th largest freshwater lake in the world.

The common perception may be that Lake Erie is a timeless entity, formed in the distant past and as ancient as any visible rock or landscape, and a feature that will remain essentially unchanged for eternity. Geologists, however, view Lake Erie, in its present form, as a very recent feature – less than 4,000 years old -- that is destined for a relatively short life, geologically speaking. The known history of the lake and its predecessors has taken place in the last 14,000 years.

The presence of Lake Erie was downplayed in the 1960 Lake County Comprehensive Plan. The plan's future land use map envisioned the Lake Erie coastline as an area lined with medium-to-high density residential uses and heavy industry, with only a few areas untouched by development.

Residents and businesses increasingly recognize that Lake Erie and its tributaries are a rich resource, providing both a natural habitat with few equals and a catalyst for future sustainable economic development.

The Lake County Planning Commission, citizen groups, local government agencies and the State Department of Natural Resources, have been working to reverse and avoid the errors of the past, and maintain a healthy balance between the wise use and thoughtful protection of the resources of coastal Lake Erie.

The Western Lake County Coastal Comprehensive Plan was completed in August 2004. The study region of this plan includes an area 1000 feet shoreward of Lake Erie between the Lake-Cuyahoga county line and the City of Mentor-Painesville

That's a lot of H₂O

The Great Lakes contain about 1/5 of all the freshwater on the planet. They contain 95% of the nation's supply of fresh water.

If all the water within the Great Lakes was spread evenly across the United States, the country would be covered under 9.5 feet (3 meters) of water.

Sizing up the Great Lakes

The Great Lakes extend 575 miles (925 kilometers) from the northern tip of Superior to the southern shore of Lake Erie, a spread of eight degrees in latitude.

From east to west, the Great Lakes extend more than 800 miles.

The Great Lakes have more than 10,000 miles (16,000 kilometers) of shoreline, longer than the entire Atlantic and Pacific coasts of the USA.

Lake Erie – Our Great Lake County, Ohio

Lake Erie is the 12th largest freshwater lake in the world.

Lake Erie has 871 miles (1,400 kilometers) of shoreline. There are 262 miles (421 Kilometers) of shoreline in Ohio and at least 26 islands in the western basin of Lake Erie. The exact number varies depending on water levels.

Lake Erie is the most southern, shallowest, warmest and most biologically productive of all the Great Lakes.

Lake Erie supplies more fish for human consumption than the other four Great Lakes combined. The Lake Erie walleye sport fishery is widely considered the best in the world.

Lake Erie's deepest point is 210 feet (64 meters). Lake Erie has three basins: the western basin includes the islands area, the central basin extends from the islands to Erie, PA, and Long Point, Canada, and the eastern basin extends from Erie, PA, to the east end of the lake. The western basin averages 80 feet (24 meters) in depth.

Lake Erie is 241 miles (387 kilometers) long with a widest point at 57 miles (92 kilometers) and the narrowest point at 28 miles (45 kilometers). It covers 9,910 square miles (25,667 square kilometers) and drains 30,140 square miles (78,062 square kilometers).

Ninety-five percent of Lake Erie's water comes from the upper Great Lakes via the Detroit River.

A drop of water entering Lake Erie from the Detroit River will take only two and a half years to reach Niagara Falls. Compare this short time to Lake Superior where a drop of water will take 191 years to move out of the lake.

Source: Lake Erie Coastal Ohio Fact Sheet

A second more detailed study, the Lake County Coastal Development Plan, was completed in 2005. The plan describes the overall coastal environment and documents a response to this environment resulting in an accessible, economically viable and locally relevant Lake County coastline. The creation of the plan is intended to:

- Lead to enhanced grant award leverage created by a regional effort.
- Serve as a catalyst for landside planning of projects at the local or regional level.
- Facilitate the selection of specific coastal projects for implementation.

Although the plan deals mainly with coastal area development, it makes the following recommendations regarding natural resources.

- Local governments should assess their coastal areas, and determine what they need to protect.
- Parkland acquisition costs should include funding for shoreline stabilization projects.
- Develop shoreline protection projects.
- Overall protection of historic and cultural sites, beaches, scenic views, natural resources, natural features and recreational opportunities, as well as the lake itself.
- Control non-point source pollution and stormwater runoff.

In Mentor, long-term projects include:

- Harbor channel improvements at the Mentor Lagoons;
- Amphitheater;
- Stewardship center;
- Observation tower; and
- Expansion of the trails in Mentor Marina and Nature Preserve

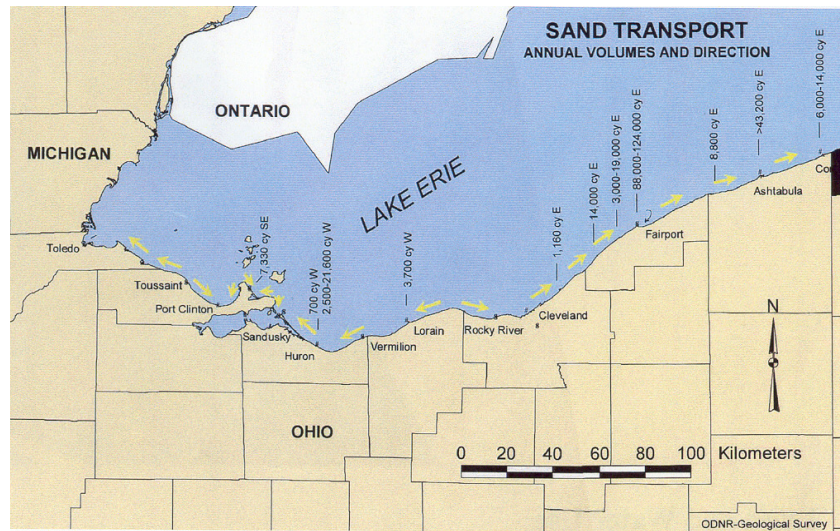
10.7 LAKE ERIE EROSION

Lakeshore erosion is the predominant geologic hazard at certain locations. Steep bluffs are formed where the waves impact the land. The height of the bluffs varies in the City. In Mentor, erosion is most noticeable along the Headlands area. Bluffs along the shoreline range from 5' to 45' in heights. Beaches are found in eastern and western sections of Mentor. From the lagoons east to the Headlands the beaches average about 100' in width. Beaches along the Headlands are extremely narrow and in some cases almost nonexistent, but begin to widen toward the Headlands Beach State Park area. Beaches along Mentor-on-the-Lake are generally quite narrow except the area just west of the Lagoons.

High bluffs along the Lake Erie shore are subject to other natural processes. The most dramatic process is called slumping. High bluffs fail naturally, and through time will eventually attain a natural stable angle of repose, or a stable slope. As the bottom of a bluff is cut away by erosion, the weight of bluff materials will cause the face of the bluff to break free. When this happens, large blocks of bluff material will collapse and fall into the lake. Waves will scour away silts and clays, leaving behind sand and stone. This is a natural beach-building process. The loss of sand caused by entrapment, groundwater seepage, surface water runoff, human activity, or changes in land use that would alter the hydrology or vegetation on a site can accelerate slumping.

Map 10.10: Littoral Sand Transport

Sand loss also has an effect on the slope beneath the water. Since beaches in the study area are narrow, there is little sand on the lake bottom to absorb wave energy. As a result, waves excavate the lake bottom close to shore. As near-shore depths increase, the amount of wave energy increases, thus increasing erosion along the shoreline.



Previous efforts to slow or stop erosion have met with limited results. Excessively long groins trap sand that would have been deposited on the downdrift shore, making those areas more susceptible to erosion; there is less sand available to buffer wave action. Owners of lakefront property in the Lake County area have often taken inappropriate measures to stop erosion, such as dumping construction debris and large objects on the beach. Dumped material will often get stirred up during a storm, gouging out more of the shoreline and accelerating slumping.

The US Army Corps of Engineers recommend several low-cost methods of protecting shoreline property. Beach fill, creating gently sloped beaches, will cause incoming waves to break and use up their energy before reaching inland areas. Perched beaches use low retaining walls to trap sand creating a new beach for recreation and shore protection are also suitable protection measures.

Map 10.11: Offshore Barrier Islands

Well-designed offshore barrier islands or breakwaters dissipate the energy of incoming waves, trapping sand behind them without concentrating destructive wave action elsewhere (Map 10.11).

Groin fields trap and retain sand, nourishing the beach compartments between them; however, they should be designed in a way where they will not cause unacceptable erosion of the downdrift shore. As indicated in the map on the previous page, the natural sediment transport is west to east. Inappropriate protection measures often deprive neighboring properties to the east sand needed to maintain natural protection that a beach provides. Revetments are engineered structures placed on steeper banks or bluffs in a way to absorb the energy of incoming waves, without redirecting wave energy to unprotected areas.

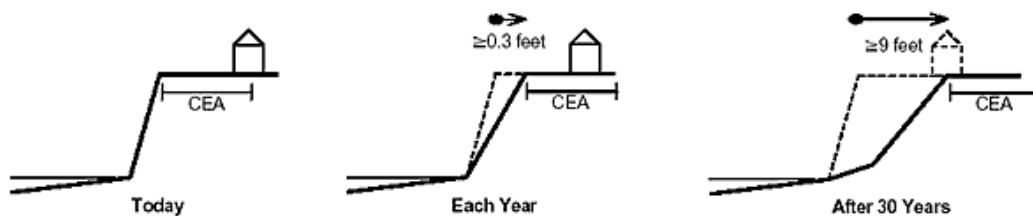


This plan recommends the off-shore barrier protection strategy for future erosion control and beach creation exercises in Mentor.

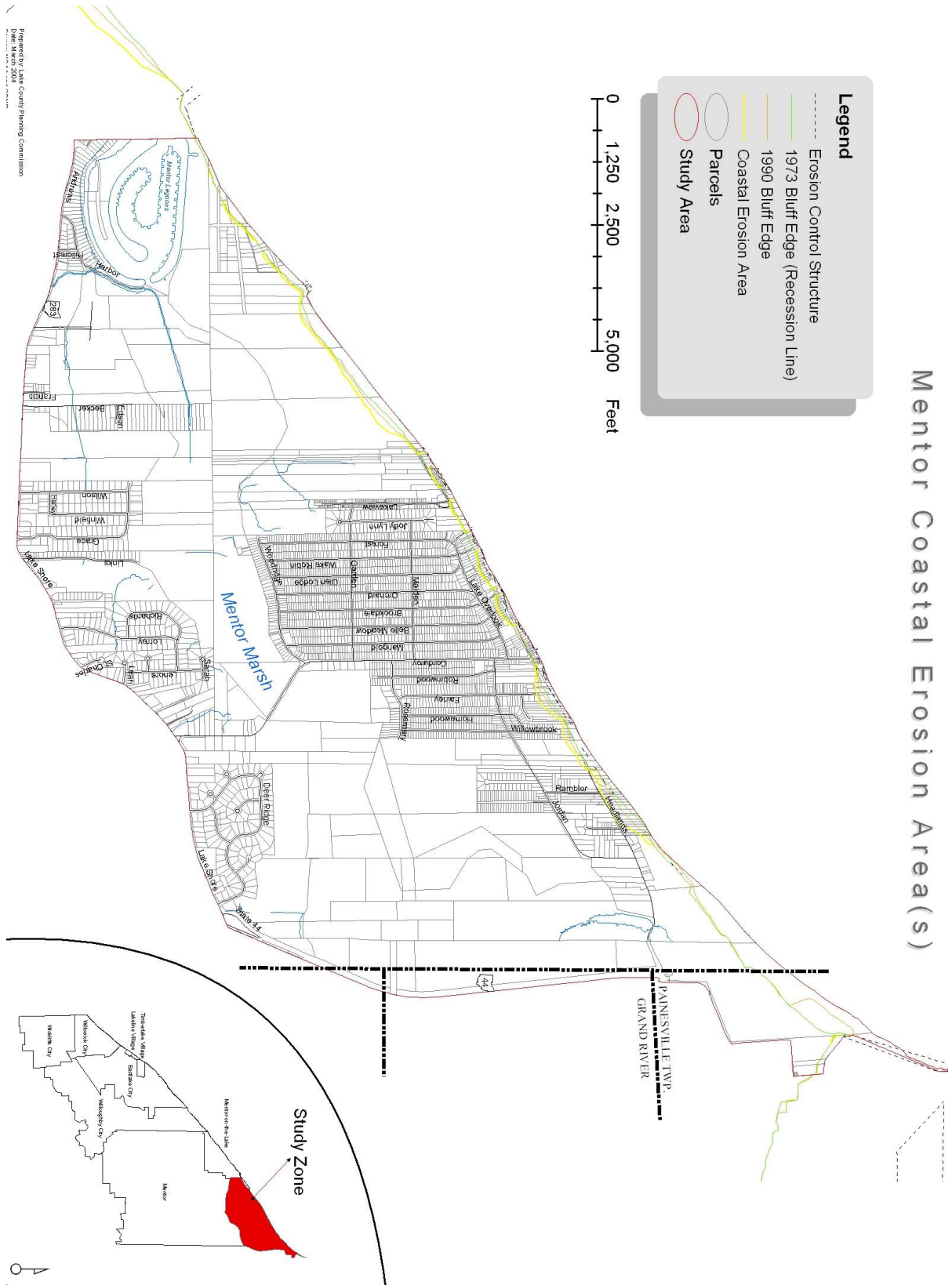
All of Mentor's coastline falls within the the Coastal Management Boundary. Community organization is the key to successful shore protection measures. A well planned, coordinated and properly constructed shore protection system extending for a distance will result in lower cost per lineal foot of protection than an individual piecemeal approach. Protection strategies vary depending on physical attributes of the site, desired results (beach vs. armor stone) and cost.

The Ohio Department of Natural Resources has developed the Coastal Erosion Area (CEA) for the entire shore of Lake Erie (Maps 10.12, 10.13). Established in 1998 (currently being revised), a Coastal Erosion Area is a designated land area along the Lake Erie shore that is anticipated to be lost due to Lake Erie related erosion *if preventative measures are not taken*. More specifically, a Coastal Erosion Area begins at the top of a bluff, bank, or beach ridge and includes all land predicted to erode within a 30-year period if that distance totals nine or more feet. The program then requires a CEA permit to be issued by ODNR for construction activities lakeward of said line.

Map 10.12: Coastal Erosion Area



Map 10.13: Mentor Coastal Erosion Areas



10.8 WATERSHEDS AND DRAINAGE

A watershed is an area designating where water will flow.

Map 10.14 shows four watershed areas of the City. Most of the land in Mentor is located in land that follows directly into Lake Erie through two watersheds. The larger of the two is also known as the Mentor Marsh Watershed. Unlike other watersheds that are designated as Lake Erie Direct, the Mentor Marsh has only one access point to Lake Erie instead of multiple points which are common in the Lake Erie Direct Watersheds. Mentor Marsh Watershed has multiple major streams; Heisley Creek and the Wasson Hurst Hawgood Ditch, flowing into it.

Mentor has land in the two major river watersheds, the Chagrin and the Grand. Ward Creek, which is located on the southwestern side of the City, flows into the Chagrin River. The Ward Creek Watershed includes Newell Creek. Kellogg Creek, which is located south of State Route 84 flows into Big Creek, which flows into the Grand River.

The capacity of the drainage facilities to accommodate storm water runoff will likely continue to affect future development in the City. Poor management of developmental impacts on the surface drainage system results in flood damage to homes, businesses, and public facilities and limits the developability of flooded vacant parcels. Erosion, siltation, and blockage of drainage courses, catch basins, and culverts by debris from careless construction methods further exacerbate the problem.

This plan endorses implementation of the Capital Improvement Plan projects identified to address drainage issues. These include, among others:

- Two-Town detention basin between Jeremy Drive and Bellflower Rd.
- Drainage assistance program and roadside ditch enclosure program
- Westmoor storm sewer improvement
- Culvert Improvement at Kellogg Creek and King Memorial Rd.
- Headlands Rd. outfall
- West Branch Marsh Creek LOMR

What's a watershed?

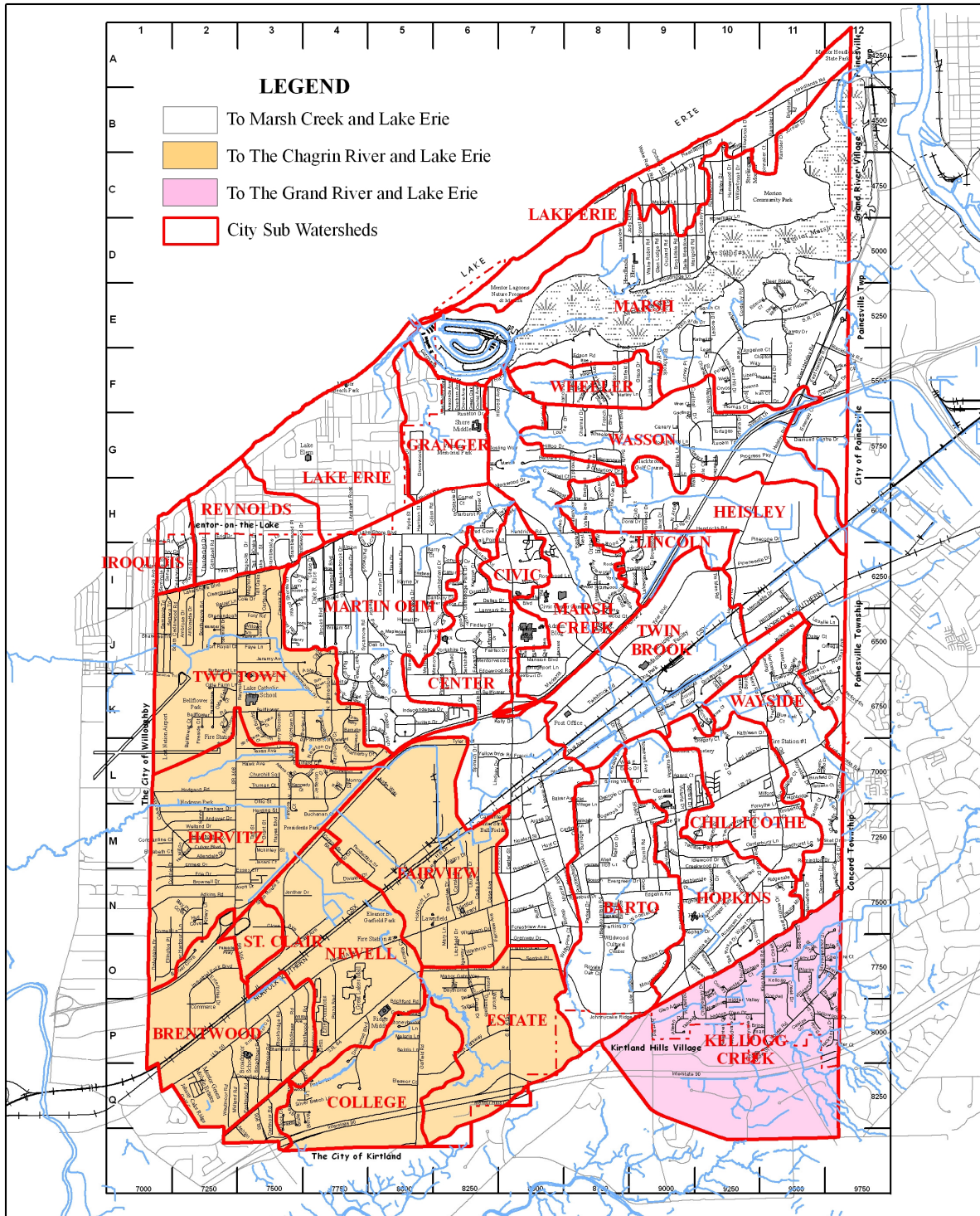
The term watershed describes an area of land that drains downslope to the lowest point. The water moves through a network of drainage pathways, both underground and on the surface. Generally, these pathways converge into streams and rivers, which become progressively larger as the water moves on downstream, eventually reaching an estuary, lake and the ocean. Other terms used interchangeably with watershed include drainage basin or catchment basin.

Watersheds can be large or small. Every stream, tributary, or river has an associated watershed, and small watersheds join to become larger watersheds. It is relatively easy to delineate watersheds using a topographic map that shows stream channels. Watershed boundaries follow major ridgelines around channels and meet at the bottom, where water flows out of the watershed, a point commonly referred to as a stream or river.

The connectivity of the stream system is the primary reason for doing aquatic assessments at the watershed level. Connectivity refers to the physical connection between tributaries and the river, between surface water and groundwater, and between wetlands and water. Because water moves downstream, any activity that affects the water quality, quantity, or rate of movement at one location can affect locations downstream. For this reason, everyone living or working within a watershed needs to cooperate to ensure good watershed conditions.

-- *Watershed Stewardship Education Program Training Guide, Oregon State University and Sea Grant Extension*

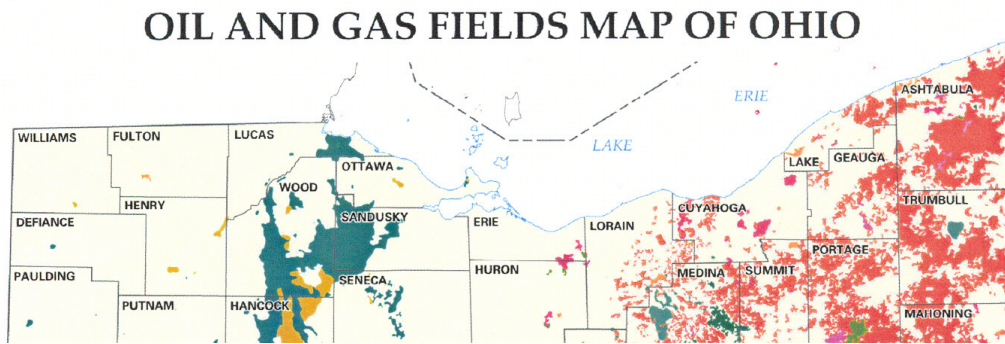
Map 10.14: Drainage and Watersheds **DRAINAGE**
COMPREHENSIVE PLAN



10.9 GAS AND OIL DRILLING

The Oil and Gas Fields Map of Ohio indicates pockets of gas fields in Mentor. This area (red on map) is a combination of three different geologic profiles: Devonian Ohio Shale and Siltstone, Silurian-Devonian “Big-Lime” and Silurian “Clinton/Medina” sandstone.

Map 10.15: Oil and Gas Fields Maps



According to the Ohio Department of Natural Resources’ “County Engineers List”, there are 450 oil and natural gas wells in Lake County, 47 of which are in Mentor. (Many of the counted wells appear on DNR oil and gas townships maps as existing, but generally are very old and have not been field verified; they may or may not exist.)

Most of Ohio's 62,902 active oil and gas wells are classified as "stripper" wells or wells that produce less than 10 barrels (42 gallons) of oil per day or less than 60,000 cubic feet of gas per day. The total production from wells in Mentor is not tabulated.

Ohio House Bill 278, passed in September 2005, declared that the Division of Mineral Resources Management in the Department of Natural Resources has exclusive authority to regulate the permitting, location, and spacing of oil and gas wells in the state. House Bill 278 bans cities and villages from regulating oil and gas drilling. House Bill 278 reads:

This chapter or rules adopted under it shall not be construed to prevent any municipal corporation, county, or township from enacting and enforcing health and safety standards for the drilling and exploration for oil and gas, provided that such standards are not less restrictive than this chapter or the rules adopted thereunder by the division of mineral resources management. No county or township shall adopt or enforce any ordinances, resolutions, rules, or requirements relative to the minimum acreage requirements for drilling units; minimum distances from which a new well or related production facilities may be drilled or an existing well deepened, plugged back, or reopened to.... No county or township shall require any permit or licenses for the drilling, operation, production, plugging, or abandonment of any oil or gas well, not any fee, bond or other security, or insurance for any activity associated with the drilling, operation, production, or abandonment of a well, except for the permit provided for in section 4513.34 of the Revised Code and any bond or other security associated therewith.

Companies now apply to the state for a permit, and are required only to notify the community and neighbors directly affected by the drilling. State law requires that a driller acquire the rights to 20 acres around the well. Community leaders may still provide comments on drilling

activity during the permit notifications process. Communities can still enact ordinances to regulate drilling, if they do not conflict with state regulations.

Public safety and pollution of the natural environment are concerns that must be weighed against the benefit of any gas or oil well being drilled. Future extraction operations should be conducted in a manner that does not intrude on parks or nearby agricultural and residential land uses, nor should it negatively impact watersheds, waterways, water tables and groundwater resources.

10.10 NON POINT POLLUTION

Nonpoint source (NPS) pollution comes from many sources in both urban and rural areas. Runoff from cropland, parking lots, lawns, mines, and septic systems often contribute to NPS pollution. Pollutants are transported to the surface and ground water by rainfall. During large storms, the runoff to surface water and infiltration to ground water increases, as does the rate of pollutant movement.

Increasingly, NPS pollution originates from urban uses, such as suburban lawns and gardens, street and parking runoff, and construction sites. Urban areas often don't have enough vegetation to slow the rate of contaminant travel. This is evident in areas with high amounts of impervious surface (commercial corridors). This can lead to a faster contamination rate where more highly concentrated pollutants are transported into aquifers.

The Ohio Department of Natural Resources recommends using best management practices to reduce nonpoint source pollution. Best management practices are a management strategy that incorporates both engineering and cultural techniques that have been effective and practical in reducing water contamination. Best management practices include the timely and careful application of fertilizers and pesticides, the construction of filter strips surrounding fields that border a surface water source, and creation and protection of wetlands, which act as filters cleaning sediment, nutrients, and other NPS pollutants.

This plan recommends continued collaboration with agencies such as the Chagrin River Watershed Partners, Lake County General Health District, and Lake County Soil and Water District for the implementation of the required NPDES Stormwater Permit.

10.11 WIND POWER

The geographic location of Mentor lends itself to relatively consistent and reliable “commercial grade” wind power. However, wind power is generally compatible with agriculture and other open land uses. The lack of large expanses of open space and the close proximity to moderate/high density residential and civic uses may produce significant visual impacts of land-based wind turbines. Siting land-based wind turbines should consider how they will impact the viewscape from existing residences and prominent scenic vistas.

Current regulations only permit communities to regulate wind turbines that produce less than 5mw. If necessary, the local zoning ordinances should address permitted vs. conditional use, height, fall zone, noise standards and general impacts of the surrounding area.

The most promising sites for wind power are expected to be Lake Erie, where wind farms will be both effective and less visually obtrusive. A study by wind research group AWS Truewind shows 39% of Ohio's portion of Lake Erie would be appropriate for an off-shore wind farm. This area includes the coastline of Mentor (Map 10.17).

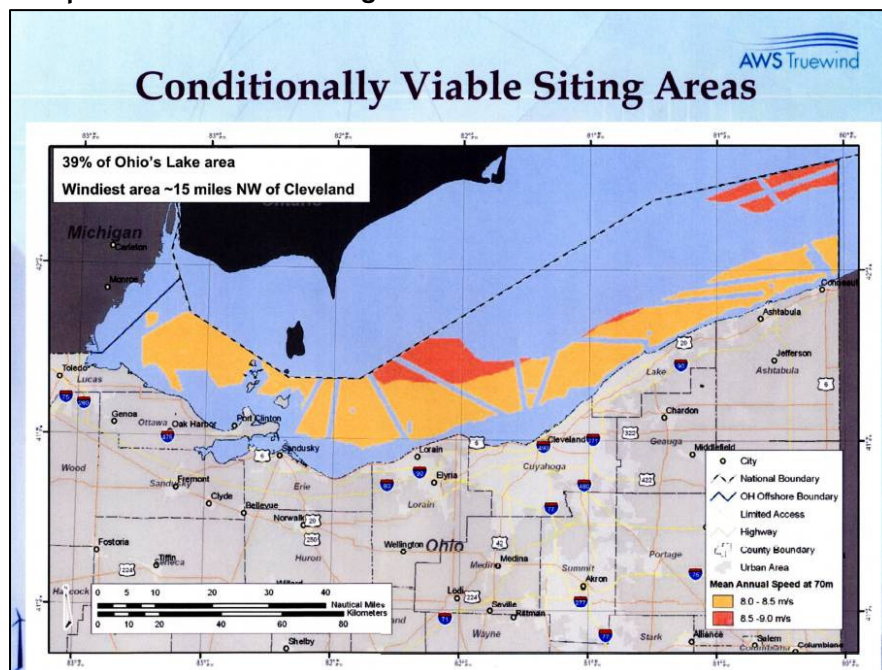
Wind power may adversely affect avian species – but recent innovations in turbine and tower design have demonstrated that impacts to avian resources can be reduced to less than significant levels.

Map 10.16: Typical Wind Turbine



Bowling Green Wind Farm (Green Energy Ohio). Ohio's first commercial wind turbines were dedicated on November 7, 2003. Bowling Green is home to the first utility-grade wind turbines in Ohio. The four 1.8 megawatt turbines in Bowling Green are the largest west of the Rockies.

Map 10.17: Wind Power Siting Areas



10.12 LAKE ERIE BALANCED GROWTH PLAN (PCA/PDA)

The Mentor Comprehensive Plan will be included in the Chagrin River Balanced Growth Plan. This plan is being developed based on a statewide program for balanced growth being promoted by the Ohio Lake Erie Commission. In 2004 the Ohio Lake Erie Commission finalized the Balanced Growth Program defined as a *local planning framework to coordinate decisions about how growth and conservation should be promoted by State and local investments*. Through this program, CRWP has been working with local communities to develop Priority Conservation Areas (PCA) and Priority Development Areas (PDA) throughout their community (Map 10.18).

- **Priority Conservation Areas (PCAs)** are locally designated area targeted for protection and restoration. PCAs may be important as ecological, recreational, heritage, agricultural, or public access areas. PCAs represent areas where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality.
- **Priority Development Areas (PDAs)** are locally designated areas where growth and/or redevelopment is to be especially promoted in order to maximize development potential, efficiently utilize infrastructure, revitalize existing cities and towns, and contribute to the restoration of Lake Erie. PDAs represent areas where land use change is predicted to have minimal impact on the watershed and where other conditions, such as access to highways, existing or planned utility service areas, and existing development, suggest that additional development may be appropriate.

The Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs) were recommended by the Chagrin River Watershed Partners, Inc. (CRWP). These maps were modified and refined with input from the Mentor Planning Commission, Council and Administration, to align with the City's planning goals. In the City of Mentor, the PDAs include:

- Existing industrial and retail areas primarily between SR2 and Mentor Ave.
- Newell Creek area (SR 615/I-90)
- Pockets of commercially zoned land along Lakeshore Blvd.

The PDA locations on the attached map reflect areas where future growth and redevelopment activities may be encouraged. Land in a PDA may be eligible for state policy and funding initiatives to encourage and support its development.

The PCA locations shown on the attached map reflect areas that are existing parks and protected properties and also include sensitive slopes, streams, floodplains, and wetlands. Scenic areas along Lake Erie, Mentor Lagoons, and the Marsh are the primary targets for conservation. In areas adjacent to these sites, lower density residential areas that may be possible to develop or redevelop should utilize conservation development strategies.

Designation of these areas as PCAs does not indicate that these areas will not be developed. However, communities could save time and money working with property owners for preservation or interested developers for alternative site designs that enable development but limit impacts to natural resources on these PCA parcels.

The PCAs and PDAs designated by the City of Mentor are included as part of the *Chagrin River Balanced Growth Plan*. This plan will include designation of PCAs and PDAs throughout Mentor and the Chagrin River watershed.

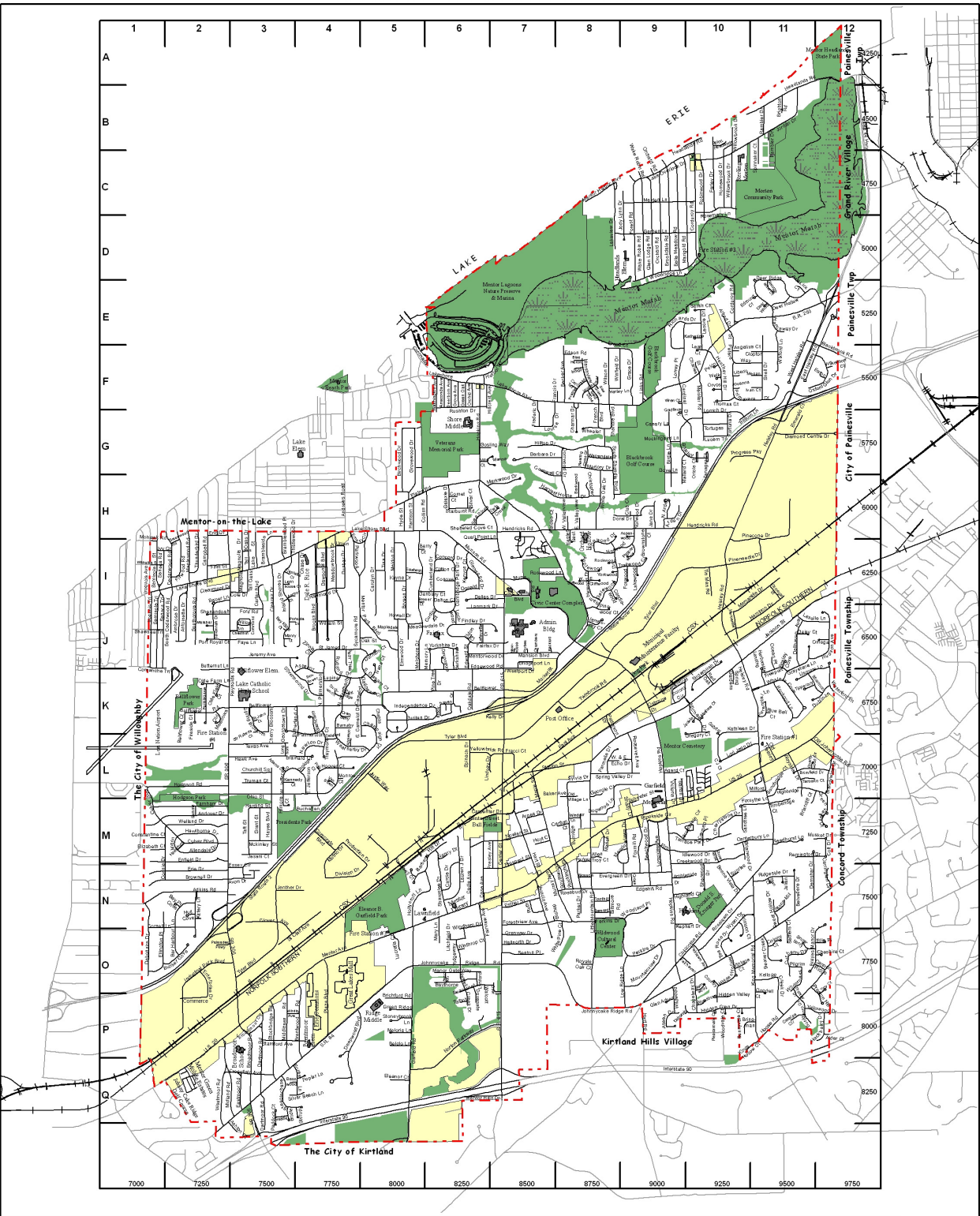
A key component of the Balanced Growth Program is that, where possible, the state should align policies, programs, and incentives to support the implementation of locally designated Priority Conservation Areas and Priority Development Areas. Communities endorsing the locally designated PDAs and PCAs will be recognized by the State as participating in the *Chagrin River Balanced Growth Plan*. This participation has a number of benefits to local communities. Some of the benefits of participation in the Chagrin River balanced growth planning process include:

- Increased state assistance for local projects;
- Support for local zoning;
- Additional state incentives, such as points on grant applications and lower interest rates on state loan programs;
- General local benefits, including minimizing long-term infrastructure and stormwater management costs and advancing the preservation of the semi-rural character of the city.

This plan encourages the utilization of this tool during the preliminary stages of development discussions in the City.

Map 10.18: Priority Conservation Areas (green) and Priority Development Areas (yellow)

BALANCED GROWTH COMPREHENSIVE PLAN



10.13 GOALS AND POLICIES

GOAL 1

“PROTECT AND CONSERVE NATURAL RESOURCES THAT PROVIDE FOR THE ENJOYMENT, COMFORT AND HEALTH OF THE COMMUNITY”

Policies:

- A. Continue participation in the Chagrin River Watershed Balanced Growth Program, in conjunction with Chagrin River Watershed Partners, Inc.
- B. Identify areas for acquisition or easements that are unique in their natural environment, landforms, or views.
- C. Protect existing trees and natural areas. Re-establish native trees and vegetation where appropriate throughout the City.
- D. Encourage Green building practices, such as permeable pavement and green roofs, which are intended to reduce groundwater runoff and the carbon footprint.
- E. The City will work to promote conservation along streams through the location of parks, open space, floodplain preservation, requirement of forested buffers, and promotion of conservation easements.
- F. Promote conservation development patterns in environmentally sensitive areas.
- G. Consider riparian setbacks on all designated watercourses.
- H. Continue to work with local, state, and regional partners on the preservation of the Mentor Marsh.

GOAL 2

“LAKE ERIE COASTLINE WILL BE PRESERVED”

Policies:

- A. The City, in conjunction with state, federal and local government agencies, will seek the continued preservation and restoration of natural habitat areas and high priority coastal sites along Lake Erie.
- B. New development along the Lake Erie shore should be clustered, to preserve natural and environmentally sensitive areas and high priority coastal sites, and provide public access to the lakefront.

- C. Shoreline protection techniques should be implemented to slow erosion and rebuild a natural environment that is more resistant to future erosion.
- D. Shoreline protection techniques should be minimally invasive, both physically and visually. Shoreline protection techniques that ultimately result in the creation of new beaches and recreational areas will be encouraged.
- E. Public access to natural resources along Lake Erie will be expanded, provided it does not hurt such resources.
- F. The use of shoreline protection techniques that would potentially increase erosion in other areas will be strongly discouraged.

GOAL 3

“MANAGE THE IMPACTS OF DEVELOPMENT UPON THE NATURAL AND MAN-MADE STORMWATER MANAGEMENT INFRASTRUCTURE SYSTEM.”

Policies:

- A. Require that all new development be designed and constructed in a manner which minimizes and controls stormwater impacts on adjacent properties.
- B. Encourage the construction of stormwater management facilities which serve multiple developments wherever possible.
- C. Ensure that the City of Mentor shall have the right of access to perform cleaning/repair/improvement upon every major drainage facility which has significant implications for downstream watershed conditions.
- D. Ensure that responsibility for the long-term maintenance of stormwater management facilities be clearly assigned and accepted as part of council approval of a subdivision.

GOAL 4

“EVERY EFFORT SHOULD BE MADE TO MINIMIZE DISRUPTIVE OIL AND GAS EXTRACTION IN MENTOR.”

Policies:

- A. Legislation that affects the placement of oil and gas wells should be monitored. Legislation that supports overriding local authority regarding well placement should be opposed or changed.

GOAL 5

“CONSIDER LOCAL REGULATIONS FOR ALTERNATIVE ENERGY SOURCES INCLUDING WIND POWER AND SOLAR ENERGY.”